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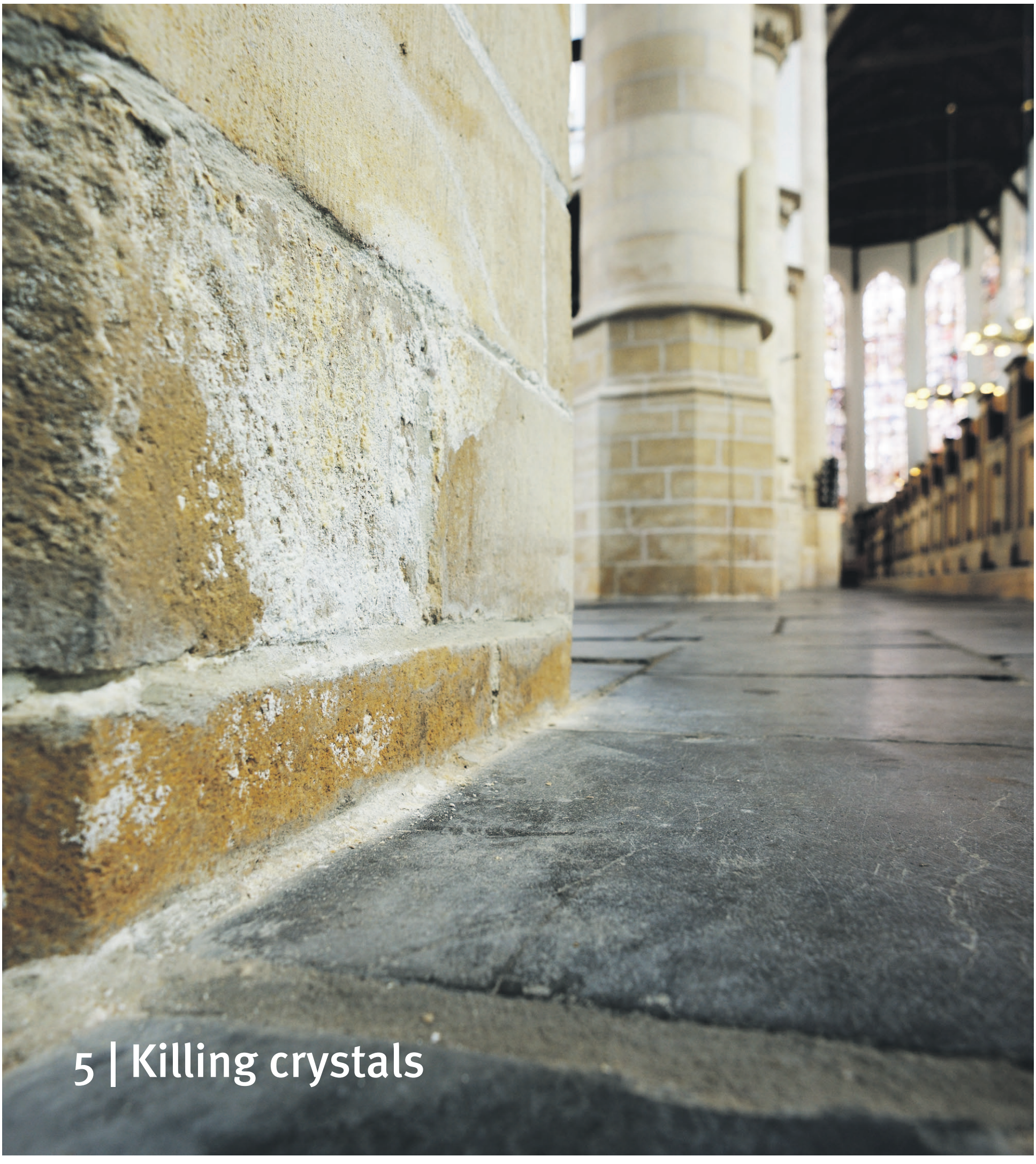

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Old soldiers

I said it last year in the farewell booklet that was put together especially for our columnist Fred Steutel: Old soldiers never die, they just fade away. Even after leaving voluntarily, Fred continued to write. On page 11 of the Dutch edition, he succinctly gives us his opinion about the changes Cursor has undergone this year. He misses the weekly frequency. Since September of last year Cursor has been a biweekly publication, which means that for breaking news, people have no choice but to check Cursor's website. After the summer break we'll be launching our new website, with an even more convenient layout and the possibility to comment on news articles. Please do so!
Fred is implicitly wondering about the disappearing of the word 'independent' that used to be printed right underneath the periodical's title as well. Don't worry, Fred, our independence is still warranted in the bylaws and we're being supported by an independent editorial council.
Still, I'll be honest: we're very curious what the TU/e community thinks of this year's changes. Are you finding us on the Internet, do you appreciate the new publication setup for Cursor, is anything lacking on our website or in our paper? We'll be looking into this shortly, but whoever wants to get anything off their chest can e-mail us right away at **cursor@tue.nl**.

Salt tears

It's common knowledge that too much salt is bad for you. But salt can also have a devastating effect on dead matter. It's sad to think that expanding salt crystals can cause irreparable damage to historic buildings and works of art, but the thought of essential concrete constructions such as bridges and weirs slowly caving in owing to tiny crystals, is nothing short of frightening. It's therefore a quite reassuring thought TU/e is trying to figure out a way to prevent this salt damage. **Page 5.**

TU/e Technische Universiteit Eindhoven University of Technology

Rewwwind
www.tue.nl/cursor

Our Rewwwind feature provides you with snippets of last week's news. What happened online after the previous Cursor magazine was published?

FOM Institute's group DIFFER to transfer to Twente

9 May 2012 - The Nieuwegein-based nanolayer Surface & Interface physics divison of the FOM Institute, DIFFER, will be moving to Twente University (UT), meaning they won't be coming to Eindhoven. The group of Professor Fred Bijkerk will become part of MESA+, UT's nanotechnology institute. The transfer involves close to twenty million euro.

Campus card for student almost done

9 May 2012 - Exercizing, checking out library books, printing and copying or using a locker: starting next academic year, students can do all of that using their new student card, the TU/e campus card. Faculty will receive the same card at a later date. Check **www.tue.nl/campuscard**.

Thêta makes Harry Roumen honorary member

9 May 2012 - Retiring university secretary ir. Harry Roumen was made an honorary member of Thêta on Tuesday, May 8. According to Thêta's chairwoman Robin Lips, the student rowing association and the Executive Board have always gotten along well. "Harry's been especially pleasant to work with; because of his position, but mostly because of his personality." Roumen is saying goodbye to TU/e community on 15 June.

Twelve percent more Erasmus scholarships in the Netherlands

8 May 2012 - More and more Dutch students decide to apply for an Erasmus scholarship to study or do an internship abroad. Many opt for sunny destinations, as numbers from the European Union show. In 2010/2011, 8,600 Dutch students left their home country on an Erasmus scholarship.
All in all, there are more Erasmus students coming to the Netherlands than there are Dutch Erasmus students going abroad - it's a difference of almost six hundred students. The total number of Erasmus-scholarship exchange students in Europe has increased by 8.5 percent: there are now over 231 thousand. Should this trend continue, next academic year will see over three hundred thousand students go abroad on an Erasmus scholarship.

Photo | IEC Archive

Photo | Han Konings

Flashback

Ice cream sales 1989 versus 2012

Nothing is certain in life, except that we'll all die and pay taxes. But wait, there's one other certainty: the ice cream cart gracing our campus with a visit every May when the sun comes back. Every year around this time, vendors of the chilly treat find their way to TU/e hoping to sell.
On May 17, 1989 - almost exactly 23 years ago, that is - this ice cream cart was located on the corner of the Hoofdgebouw, and its ice cream cones were in high demand, apparently.

On Monday, May 14 this cart, property of Zinin, was positioned on the lawn in front of Vertigo. Part time vendor Floor just graduated from ROC as a social worker, and she has three flavors on offer for a euro each: chocolate, strawberry and vanilla. And sales are still good. "This paper bag contained all my cones for the day and it's pretty empty already", Floor says. She's not looking for a career in ice cream, but decided to apply to a university of applied sciences for next year. (HK)

Clmn The gentlemen

I have always been curious why most Dutch people look so happy. Always smiling, polite, ready to help strangers and showing no signs of aggression toward each other. My interaction with them left me with the impression that they're mild-mannered and gentle people. Therefore, I've become used to calling them 'gentlemen' despite their gender, emphasizing their gentleness.
I think that the reasons for such behaviour lie both in the government's tax policy and the Dutch national mentality. Since almost 40% of people's personal income goes to taxes there are no extremely rich people. Most of this money is later used for the development of infrastructure and helping the less fortunate. Therefore, there are no extremely poor people either. This 'Not everyone can be rich but nobody should be poor' policy removes social tension and envy among people resulting a low level of mutual aggression in daily life. Another reason is a modest approach to visual evidence of hierarchical social status. Men drive cheap simple cars rather than luxurious expensive ones, even though they can afford them. Women don't wear luxury brand clothes and jewellery, but instead prefer to look as simple as possible.
Now, another question has sparked my curiosity - what motivates those people to develop themselves and their careers? Is it the motivation to 'never lose'? No, because even by working as, for example, a bus driver, people may still afford good living standards. Is it the motivation to 'always win'? No, because society has a hierarchically plain structure. I don't know the answer to my latest question, but seeing the results my rational mind's still blown.

Sultan Imangaliyev, from Kazakhstan, is a student of Systems & Control, Department of Mechanical Engineering

Vox Academici

Dr.ir. Joep Frens, assistant professor of Designing Quality and Interaction, Department of ID

Will 3D-printed mass production lead to the third industrial revolution?

Dr.ir. Joep Frens. Photo | Bart van Overbeeke

A personalized bracelet, a one-piece chair, body parts? It can all be printed in 3D. There are even 3D printers that can print components of their own parts. It's clear that 3D printing is booming. Last week, research institute TNO presented the next step: Print Valley, an assembly line of 3D printers. There's even talk of a third industrial revolution. Is this type of custom-made mass production really that innovative? Will our future be a printed paradise?

"A new industrial revolution? Maybe. These developments are definitely interesting, but I'm not a futurologist. Anything could happen, and I don't want to make any statements. I'd rather just see things take their course." Joep Frens, assistant professor of Designing Quality in Interaction at the Department of Industrial Design is speculating.
"From the perspective of mass production, 3D printing hasn't fully matured yet. If you want to draw a parallel with today's ordinary printer: in the days of the matrix printer, everyone could print simple documents, but for actual posters, people would still visit the print shop. Still, it's all developing rapidly. On the one hand, there's an increase in the use of DIY printers, and on the other hand there's a lot going on in the field of professional printing, like TNO's Print Valley. You should see the possibilities after only a few years of experimenting. You can print stainless steel, gold, glass, and stone powder. And as soon as 3D printing allows mixed materials, we might even print electronics - the sky is the limit."
"Of course the increase of 3D printing will have an impact, if only on the production process. We're having many parts assembled in low-wage countries. But if that assembly becomes redundant, production can move back to western countries. And then what? Will China's economy come to a standstill? I wouldn't know, but I definitely hope not."
From a technological perspective, I'm all for it. But technology is being contextualized by the society in which it exists; it's surrounded by all kinds of social and political issues. Because of that, it's more challenging to attach value to it. Being very matter-of-factly, the main advantage of 3D printing is the possibility of producing products on demand and personalizing them. The latter is a very exciting development to me. It's terrific that people can create their own products easily and perfectly tailored to their needs. I hope it makes for a stronger attachment to the product, so we can leave our disposable society behind us."
"At the same time, however, having a cute printer at home is the biggest threat: Great, why don't we all have a bunny for our Easter brunch; why don't we print some cute Christmas trees to put next to our plates? If that happens, we start producing a lot. And never mind the fact that petroleum derivatives are currently the number-one raw materials for 3D printing..."
"Some people say the rise of 3D printing will marginalize the role of the designer. I like to think of it as a new opportunity. After all, our expertise - skills, experience, and sensitivity - will always be needed. A designer is trained to think outside of the box, but they're by no means almighty. So I think it could lead to new ways of collaboration between designer and user yielding true innovations. On top of that, I like to believe a product has added value when someone makes an effort as far as design or production go. People don't want mass production all the time. Using a beautiful, handmade mug beats drinking from a plastic cup every day, right?"
"The design practice will definitely change, but I'm not yet sure how. I'm very open to all of it. Not wait-and-see, but open. I'm curious about the developments and my research also discusses how that will influence the designing process. Several years ago, I was involved in the purchase of our professional 3D printer, and back then I also bought a number of DIY 3D printers to study the possibilities for industrial design. What if we were to make the 3D printer into a 'physical' channel of communication, so fellow designers located all over the world could communicate instantaneously, like Skype does using video? And what visual language will come with this technique? How will it change the way we interact with the world?
3D printing is a new tool that even enables individuals to add to or change functionalities, which allows for a new way of interaction. It's why I don't consider 3D printing a threat, but rather as a fascinating new technological tool to expand my possibilities as a designer." (NT)

Helplessly waiting for arrows


Photo | Rien Meulman

In the weekend of May 12-13, **28 foam animals** were put up to be hit by some **180 archers** in light of the 3D Challenge organized by Eindhoven Student Archery Association Da Vinci.

0 live animals were hit, but that wasn't the intention, either.

2 Da Vinci members got drenched in the Dommel River during the canoe trips retrieving arrows. **10 arrows** could not be found.

The archers spent approximately **6 hours** a day walking, arching and resting. They camped in **12 tents** and **6 caravans/campers**. (NS)

“I’m dreaming of an accessible TU/e campus”

Accessibility campus | Nicole Testerink
Photos | Bart van Overbeeke

In the annual student satisfaction survey ‘Studying with disabilities’ published by expertise center disability+study, TU/e ended in third place last month, after having dangled at the bottom of the list for many years. Although wheelchair users do seem to be satisfied with the facilities on the TU/e campus, prospective architects are considerably more critical of the accessibility to wheelchairs. In their view it is especially the meager signposting and the limited number of toilets for the disabled that form the bottlenecks. For what is to be done when you work on the tenth floor and you have cystitis? A tour across campus in a wheelchair.

Flushed with exertion twelve students of Architecture, Building and Planning together with assistant professor Hüsnu Yegenoglu, all in wheelchairs, are trying to reach the TU/e campus via the Limbopad. In the context of ExperiArch, an activity set up by student association AnArchi, they are testing the accessibility to wheelchairs of various TU/e buildings. “We want to experience ourselves what it’s like for disabled persons to move about in buildings, so as to find out what design engineers need to take into account”, Alice Janssen, a Master student of Architectural Design and Engineering, explains.
The problems they encounter on their odyssey are often to do with distance. For instance, wheelchair test rider Hüsnu Yegenoglu has trouble reaching the door handle in the Hoofdgebouw and a moment later knocks a litterbin off the wall when he wants to turn round in the toilet. Things are awkward in the canteen on the sixth floor also. Frank van Hoogstraten has trouble maneuvering his wheelchair through the jumble of chairs; a cup of coffee can only be obtained thanks to a forthcoming canteen co-worker- the machine is out of reach.
In the Auditorium the trade entrance does not pass muster. Together with a cartful of sandwiches Simon Reumers is in the elevator towards the first floor. “Although we can get everywhere with the service elevator, it is not as if you really feel welcome.” At Vertigo, too, there is criticism of the back entrance. “It is poorly indicated and there is no reply when we use the intercom. With luck you’ll come across somebody smoking outside, otherwise you can’t get in”, as Kenny Vonk finds out.
Moving around in wheelchairs for a few hours yields a great many insights: “Your spatial experience is totally different, you find out that many things which you take for granted are far from self-evident. And in fact many things can be solved in very simple ways. It’s quite confrontational that you haven’t considered those things for so long”, are some of the conclusions of the participants. They are unanimous about the accessibility to wheelchairs of the TU/e campus: “It can be done, but could definitely be better”.
In many cases it is just a matter of being creative, according to Harm van Luijtelaar, employee of the workshop of Architecture, Building and Planning. “We hardly get so see any disabled persons here. If so, it’s mostly of a temporary nature, such as a broken leg. There’s always a solution of some sort: an adjusted table, make a step or move a socket. During our semiannual company emergency response drill we take disabled persons into consideration. For example, we practice with an Evac+chair so as to be able to carry wheelchair users down the stairs in an emergency situation.”
In the Hoofdgebouw it is recommended to announce your presence as a disabled person so that people are aware in case of emergency that assistance must be provided; in many cases this implies that you still need to call the reception first. “You may not like it, but that’s the way it is”, says a facilities employee of the Hoofdgebouw. And you will just have to make do with that as a wheelchair user.

“When accessibility is an issue that is taken into consideration at an early stage of the building process, a great may things are possible without taking away from the architectural concepts”, says Hüsnu Yegenoglu, assistant professor of Architectural Design & Engineering at the Department of Architecture, Building and Planning. “Often you see that at the very last moment a back entrance is arranged and a toilet for disabled persons is placed in a forgotten corner. The devil is often in the detail, though: a light switch that has to be taken down a few decimeters, and a washbasin that is located too high. I also find it important that an item like segregation should be reflected on - the creation of a social distance. If I as a Turk am separated from my Dutch friends and have to go in somewhere via a trade entrance, then that is called discrimination. However, for disabled persons this is in many cases an everyday occurrence. Is it really that difficult to construct an accessible main entrance? We need to make our students aware of the accessibility aspect. Therefore I should like to set up a graduation studio about accessibility and architecture, so that they learn to think about spaces in a different manner.”

Joris Penders.

“Easily across TU/e at full throttle”

Joris Penders (22) grins when he hears about the toilet discomforts of several wheelchair test riders. “It’s a matter of practice. I have no problem whatsoever with the toilets here and I also think there are enough of them. You soon get used to the few seconds it takes to descend from a higher floor to the ground floor.”
Joris has been in a wheelchair for two years because of a spinal cord lesion. “I’m fairly positive about the accessibility to wheelchairs at TU/e. Good parking spaces, many automatic doors, everything easy to find on the Internet. Theoretically everything is in order, although there are a few clumsy spots to be found here and there in actual practice. For instance, the sockets in the Auditorium have been concealed under the tables, so they’re almost unreachable from a wheelchair.
Also, on the walkways one of the double doors is often closed, which makes the passage very narrow indeed. Well, you can get annoyed at little things all the time, but that doesn’t do you any good. You know that you’re in a minority group; the world cannot adapt entirely to you. And you won’t hear me complaining here at TU/e, for I often move through the buildings at full throttle.”

BCVG: “Clearer signposting thanks to an app”

“It’s very good that future architects and building engineers are made aware of the importance of facilities for the disabled”, says Bert Verheijen, a member of the Facilities for the Disabled Executive Committee (BCVG) of TU/e. “Often this point is taken into consideration only at a late stage of the construction process, when adjustments usually form an impediment for architectural ideas.”
It is also thanks to the efforts of the BCVG that many improvements were made across the TU/e campus in years past. This translated immediately into an increase in student satisfaction in the annual survey that is conducted on behalf of the expertise center disability+study. “We’ve made an inventory of all the buildings in order to get a clear view of bottlenecks and we’re working on the signposting. The problem is that central facilities are often located on the first floor and many TU/e buildings are rather old. At the time they met the requirements, but now that these have been made more stringent it is often by no means simple to keep a building up-to-date. And yet the accessibility is definitely not bad”, his colleague from Real Estate Management Saskia van de Mortel-Benda adds.
The BCVG is also closely involved with the new buildings and/or alterations that are in progress on the TU/e campus. Verheijen: “A great opportunity to consult with the architects at an early stage. The Executive Board also devotes itself to the improvement of the accessibility, both for the limited group of disabled persons studying or working at TU/e, and for the visitors to public buildings such as the Auditorium and the Hoofdgebouw. Besides, in collaboration with the Communication Expertise Center we have posted clear maps indicating the facilities on the Internet, so that people can prepare in good time. Which will be even easier as of September. There will be an app for android and iPhone showing the way on campus and in the various buildings. As BCVG we have taken this up at once in order to accommodate the facilities for the disabled as well. Accessibility must be a standard starting point.”

The salt out of the (concrete) earth

Salt damage | Tom Jeltes
Photo | Bart van Overbeeke

To prevent salt damage, you can use electric fields to extract salt from buildings and works of art. Beautiful though this may sound, does it really work better than traditional methods? The physicists of the Transport in Permeable Media (TPM) subdepartment are trying to find an answer to this question. About the danger of salt in monuments and concrete constructions.

Whilst salt in your food is tasty, in a stucco wall featuring a fresco by Leonardo da Vinci it is quite another matter. The presence of sodium chloride (kitchen salt) or sodium sulfate in old buildings and sculptures is a ticking time bomb; in course of time it begins to expand due to crystallization, thus pushing away the surrounding material - in the worst case it leaves merely a pile of grit.

Salt leaves merely a pile of grit

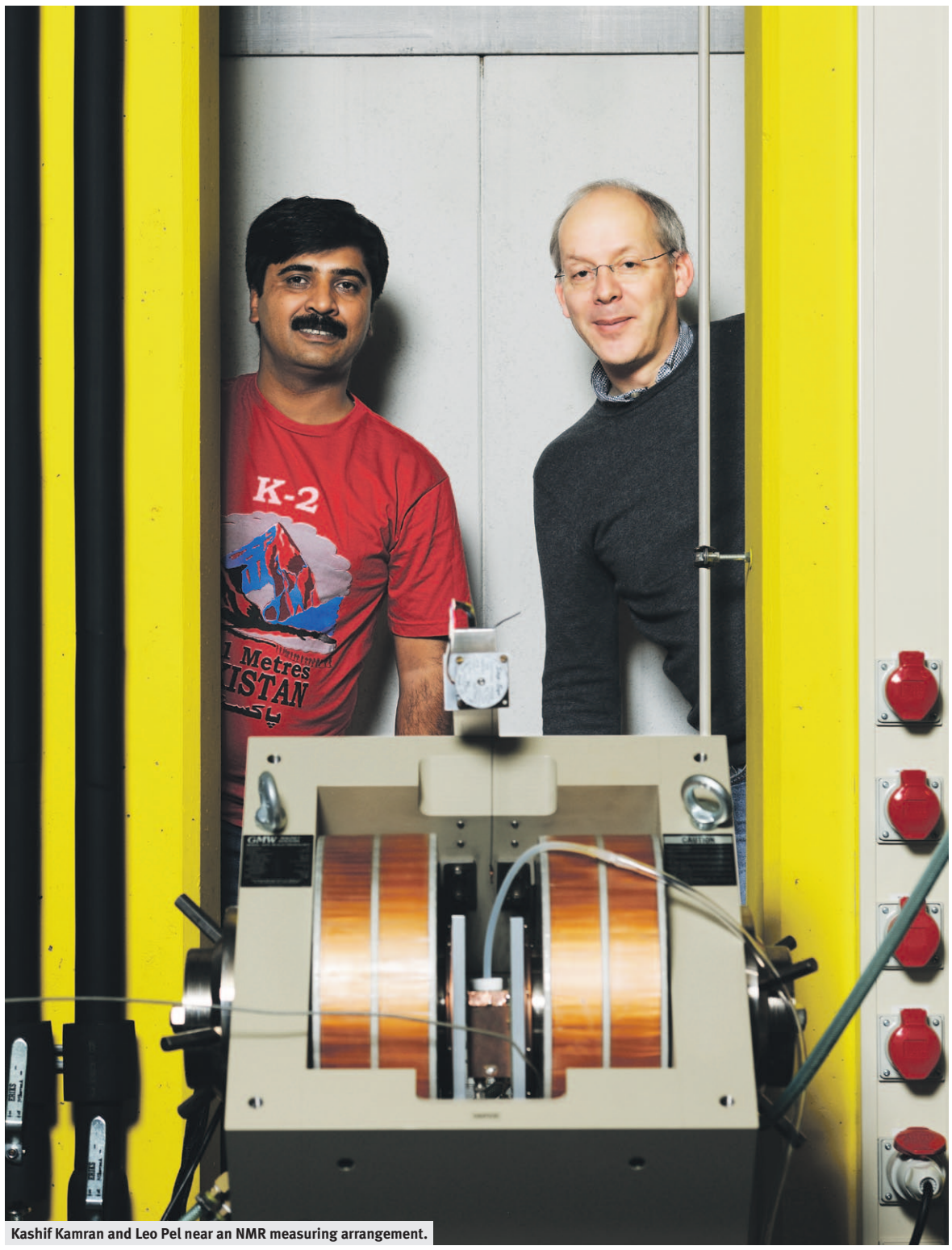
How fast this process can do its destructive work is illustrated by dr. ir. Leo Pel of the TPM subdepartment on the basis of a film in which a piece of sandstone is placed erect in a bin of sodium sulfate. In 90 seconds of film it can be seen how the sandstone crumbles down fully within a period of a month until hardly anything is left of it. Of course, it is an extreme scenario -most buildings are not located in a bath of sodium sulfate- yet it almost makes tangible the process which normally takes decades to centuries to unfold.
"You can imagine that the preservation of our cultural heritage will benefit from a way to remove salt from bricks, for instance", says Pel. "Traditionally this is done through a method called poulticing, the application of packs of a kind of papier-mâché which, through diffusion, absorb a portion of the salt from the stone. By regularly refreshing those poultices, you can in the long run remove most of the salt from the top layer. However, this is a very labor-intensive and hence expensive procedure." And poulticing has yet more drawbacks: you only reach the outer layer of some two centimeters and its effectiveness depends strongly on the size of the pores in both the stone and the poultice. In addition to diffusion, there are still other ways of extracting salt from a porous medium. In principle the positively and negatively charged ions can be literally pulled out of the material by means of an electric field. "This has been known for a long time", says Pel. "The oldest article in which this method is described I once managed to trace in archives in Leipzig." It dates from 1809, less than a decade after the discovery of the battery by Alessandro Volta.
This so-called electrokinetic extraction is used regularly for soil cleaning, and Pel's Danish colleagues in particular are firmly convinced that this electric method is also very appropriate to desalt buildings.
Pel's group has been involved longer in the protection of cultural heritage in the form of old buildings, sculptures and such. In the B-wing of N-laag, Transport in Permeable Media has a unique laboratory at its disposal equipped with a large number of NMR measuring devices. This equipment allows them to see in great detail how water and dissolved salts move through a brick, for example, under the influence of desalting attempts. Whereas normal NMR (Nuclear Magnetic Resonance) can only show hydrogen nuclei, the Eindhoven scientists have succeeded in also making lithium, sodium and chloride ions visible - in the case of chloride they are even the only group in the world to have done so, says Pel. It enables them to research the claims of proponents of the electrokinetic method. "In most of the research conducted, the desalting method is left to do its work for a relatively long period and it is checked afterwards what the result is. Then it turns out that the central portion of the bricks that have been treated with electric fields still contains a lot of salt. However, it means you still don't know why this is so.

TPM is the only group in the world able to follow chloride ions by means of NMR techniques

Our equipment enables us to follow the process in great detail. And then it appears that this problem is not due to inhomogeneities in the brick, as the claim goes. I didn't expect that either, for that matter, as Dutch bricks are of a superior quality and very homogeneous indeed. We can see that water is split up at the electrodes in the basic hydroxide and acidic hydrogen ions. They come together in the center of the brick, where they disturb the effect of the electric field. Moreover, this base and acid seriously affect colors. So it is definitely not advisable in all cases to apply electrokinetic extraction. Take those magnificent blue tiles that you see all around Lisbon, for instance, I definitely wouldn't do it there."
The above conclusions emerge from the work performed by the Pakistani PhD candidate Kashif Kamran, who defended his dissertation on May 15. Last year another researcher, Victoria Voronina, already obtained her PhD degree on the basis of a comparable study of the effects of poultices. "There is also research being conducted here into the way in which salt damage occurs exactly as a result of crystallization. Within that context we have someone who is doing PhD research into sodium chloride and another PhD candidate who is researching sodium sulfate."
The aforementioned fundamental research is combined with close contacts with the famous Getty Museum in Los Angeles, among others, and a number of curators, one of whom, Alison Sawdy, is even contributing to the writing of the articles. "Nevertheless, many curators understand precious little of the techniques they use, as I found out when I was teaching American curators. For them it is only one of many aspects that they need to master, of course."

Meanwhile the Nijkerk bridge is being shored up because of salt damage

Although Pel's heart is clearly in cultural heritage, he is aware of a gradual shift towards coarser matter: concrete, too, suffers from salt damage. Only recently he was consulted as an expert about the Nijkerk bridge "which is alleged to be about to collapse" and has meanwhile been shored up. And the Afsluitdijk (IJsselmeer dam) is also being affected by the salt water permeating the concrete foundation. When chloride gets to the reinforcement, Pel thinks that will be the end of the construction. This may be prevented by realizing an electric tension. "Now that we're capable of following chloride ions, we are the proper group to conduct research into this."
For concrete the danger emerges from a so-called alkali-silica reaction as a result of the sea water, which causes the concrete to expand. Damage to concrete can be prevented by making it absorb lithium, says Pel. "Via diffusion this takes place within less than a century, but electrokinetics does come into play here as the solution. For you can also use the electric fields to make salt penetrate materials. Concrete is less vulnerable to acids and bases, which is an advantage. Still, we first want to see how this process evolves over time before recommending this method." (TJ)



Kashif Kamran and Leo Pel near an NMR measuring arrangement.